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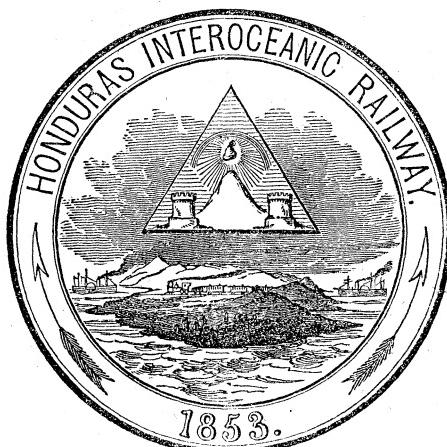
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HONDURAS
INTEROCEANIC RAILWAY.



PRELIMINARY REPORT.

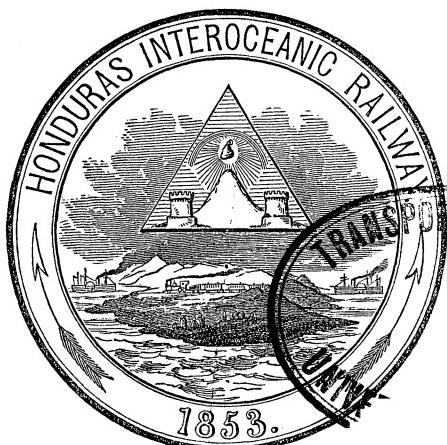
By E. G. SQUIER.

OFFICE OF COMPANY,
13 PARK PLACE, NEW-YORK.

NEW-YORK:
TUBBS, NESMITH & TEALL, PRINTERS, 29 BEEKMAN ST.

1854.

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13 PARK PLACE, NEW-YORK.

O F F I C E R S.

AMORY EDWARDS, *President.*

E. G. SQUIER, *Secretary.*

AUGUSTUS FOLLIN, }
U. S. Consul, Omoa, } *General Agent in Honduras.*

NOTICE.

ALL the rights, interests, privileges, and property of the HONDURAS INTEROCEANIC RAILWAY COMPANY have been divided, by act of the original Grantees and Proprietors, into the fixed number of ONE THOUSAND SHARES, represented by an equal number of Share Certificates.

The Company does not propose to issue Stock, nor to open books for Stock Subscription, until their road shall be located, and actually under contract, and the cost of constructing the same, and putting it in working order, accurately known.

To aid in carrying forward the work to that point, a limited number of the above One Thousand Shares have been reserved in the Treasury for sale, at rates to be determined by the Board of Directors.

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HONDURAS

INTEROCEANIC RAILWAY.

I HEREWITH submit to the Associates and Board of Directors of the Honduras Interoceanic Railway, a summary of the *reconnaissance* made by me, in the year 1853, of the line of the proposed "HONDURAS INTEROCEANIC RAILWAY." This *reconnaissance* was conducted with great rapidity, but the results are clear and conclusive, and may be summed up in a very few pages.

Lieut. JEFFERS, who was attached to the expedition, almost immediately after his return to the United States, was ordered to the Brazil Squadron. In consequence of this circumstance, his complete report has not yet been received. His preliminary report, however, will be found in the Appendix, in conjunction with a letter from AMORY EDWARDS, Esq., President of the Company, who has recently returned from Honduras, and a communication from Capt. THEODORE LEWIS, in reference to Puerto Caballos, the northern terminus of the proposed Railway.

Appended hereto are also, 1st. A general outline map, showing the actual and proposed routes of Interoceanic Communication; 2d. A Sketch Map of the line of the road from sea to sea; 3d. A chart of Puerto Caballos, the northern or Atlantic terminus, from

the surveys and soundings of Lieut. Jeffers and Capt. Lewis; and
4th. A chart of the Bay of Fonseca, the southern or Pacific
terminus of the proposed road.

The general map of Honduras, and the general and sectional
maps of the road, are still in the hands of the engravers, but will
be attached to my final Report, which will comprise also a gene-
ral account of the topography, climate, productions, resources,
population, etc., etc., of Honduras.

Respectfully,

Your obt. servt.,

E, GEO, SQUIER,

I.—GENERAL OBSERVATIONS.

THE line of the proposed "HONDURAS INTEROCEANIC RAILWAY," commences at Puerto Caballos on the Bay of Honduras, in Lat. 15° 49' N., and Lon. 87° 57' W., and runs nearly due south, across the continent, to the Bay of Fonseca on the Pacific, in Lat. 13° 21' N., and Lon. 87° 35' W. The total length of the line from anchorage to anchorage, or from five fathoms of water in Puerto Caballos to five fathoms of water in the Bay of Fonseca, is 148 geographical, equal to about 160 statute miles. This line lies wholly in the State of Honduras, whose territorial right and sovereignty over it has never been called in question. Starting at Puerto Caballos, the line of the proposed road pursues a course a little east of south, across the plain of Sula, until it strikes the Rio Ulua, near the town of Santiago. Thence it follows the valley of that river, now called the Humuya, to its very source, in the great plain of Comayagua, a distance of not far from 100 miles from Puerto Caballos. At the southern extremity of this plain there is a slight elevation, which constitutes the "summit" between the Atlantic and Pacific. Here the sources of the Humuya interlock with those of the Rio Goascoran, which flows through its proper valley, into the Gulf of Fonseca.

Two important facts are to be observed in tracing this line : 1st. The valleys of the Humuya and Goascoran, in conjunction with the central plain of Comayagua, *constitute a great transverse valley extending from sea to sea, completely cutting through the chain of the Cordilleras*; and 2d. That this great transverse valley or natural cut, extends due north and south, and permits the location of the proposed road so that, in its whole course, it will scarcely deviate five miles from a right line. These natural conditions, not less than capacious, safe, and altogether unexceptionable harbors at both extremities, and a country entirely salubrious, distinguish this line as combining the obvious and primary requisites for an

adequate and permanent Interoceanic Communication, to a degree which has no parallel in any project which has yet been presented to public consideration.

Without intending any invidious comparisons, it is nevertheless the fact that the proposed road, not only in the respects above enumerated, but also in respect of distance, has great advantages over any Railway yet projected across the Central Isthmus. Its construction will shorten the distance between the Atlantic ports of the United States and California, Oregon, the Sandwich Islands, and the centres of Oriental trade, not less than 1100 miles over Panama, 800 over Nicaragua, and upwards of 200 over Tehuantepec, following the line which the company, holding the charter for a road over the latter isthmus, are obliged to follow.

And when the Railway connections which the company propose to establish with the Gulf of Mexico are complete, *the passage from New-York to San Francisco, viâ Honduras, will be effected in less than fourteen days, or within about half the time now occupied in the voyage.* The nature of the arrangements now in progress to this end, when completed, will, I presume, be made the subject of a special publication. I shall, therefore, confine myself in the following pages, to a rapid review of the proposed line through Honduras, from Puerto Caballos to the Gulf of Fonseca.

II.—PUERTO CABALLOS.

PUERTO CABALLOS, as I have said, opens on the Bay of Honduras, in Lat. $15^{\circ} 49' N.$, and Lon. $87^{\circ} 57' W.$ It was selected by Cortez, in his expedition into Honduras, as the best port in all the country then known as New Spain; and he established a settlement there, with the purpose of making it the grand *entrepôt* of Spanish North America. For more than two centuries it was the principal town on the coast, and was finally removed to Omoa, a few miles to the westward, during the time of the buccaneers, because it was too large to admit of defence, except by the construction of several forts, while a single work was adequate to the protection of the small port of Omoa. The accompanying Chart of

the Port will give a better conception of its character and capacity than can be afforded by a description. Lieut. Jeffers, in submitting his survey, observes, "*Puerto Caballos is a good harbor, of great capacity, sufficient depth of water, and easy of entrance and exit.* Situated at the base of the hills, there are neither marshes nor swamps to affect the healthfulness of the locality, which is sufficiently extensive for the formation of a large city. The lagoon, which is of salt water, and open to the sea, abounds in fish."

The winds which prevail on the north coast of Honduras are from the N. E., N., and N. by W., from all of which the port is perfectly protected. W. and S.W. winds are scarcely known, and are furthermore entirely cut off from the port by the high hills and mountains skirting the coast in that direction.

The Port, or rather Bay, is of large capacity, being not less than nine miles in circumference. Its depth is ample, ranging, for more than two-thirds of its area, from 4 to 12 fathoms, with secure holding ground. Towards its northern shore the depth of water is greatest; and by the construction of docks sixty feet in length, the largest ocean steamers may enter and receive and land passengers and cargo more easily than in the docks of New-York, inasmuch as, in this portion of the Bay of Honduras, the rise and fall of the tide is almost imperceptible.

Connected with the port or bay is a large salt-water lagoon, upwards of two miles in length, by about a mile and a quarter broad, of equal depth of water with the port itself. Should it ever be thought proper, the connecting channel may be dredged so as to permit vessels to enter the lagoon, where they would be completely land-locked, and where no wind could affect them in any perceptible degree. In place of deepening the connecting channel, an open cut, a few hundred yards in length, would effect the same result. This cut could be made through firm ground, and once constructed would remain permanently open, as none of the causes which operate to fill up excavations exist here.

The ground around the port is firm, and a considerable part of it cleared and under cultivation. In abundance of good water, and in fertility of soil, the neighborhood of Puerto Caballos offers every condition necessary for the building up and support of a large and flourishing town. And it cannot be doubted that the commencement of the proposed work would attract here, not only

a considerable part of the present population of Omoa, but a great proportion of the inhabitants of the English establishment of Belize, which, shut in by dangerous reefs, and built in the midst of a vast, pestiferous swamp, is disqualified from being the centre of the growing trade of the neighboring countries.

For further information respecting Puerto Caballos, see Appendix C.

III.—PUERTO CABALLOS TO SANTIAGO.

FROM Puerto Caballos, in order to reach the great and beautiful plain of Sula or Santiago, through which flow the large rivers Chamelicon and Ulua, it is necessary to make a small circuit of about three miles, to turn the eastern end or base of the high mountain chain of Merendon or Omoa, which is a branch of the Cordilleras, and which here finds an abrupt termination.

The plain of Sula forms a great triangle, its base resting on the sea and extending for upwards of fifty miles along the coast from the outposts of the mountains of Omoa, to those of Congrehoy, and its apex extending due south on the line of the proposed road, in the direction of Comayagua. A portion of this plain, to the right or eastward of the Rio Ulua, is low, and during high water subject to overflow. Such, however, is not the case with the western portion of the plain, over which the road will be located. Here the ground is firm, and the streams have all sand or gravel beds. No bottomless marshes, such as those which have obstructed the Panama road, are found here, nor indeed upon any part of the entire line.

In the opinion of Lieut. Jeffers the road, after turning the base of the hills, back of Puerto Caballos, can be made perfectly straight to the town of Santiago, where the Ulua is formed by the junction of the rivers Santiago, Blanco, and Humuya. The latter, keeping the direction of the Ulua from N. to S., should properly bear the same name. From Puerto Caballos to Santiago there formerly existed a graded road, which may still be followed, although much grown up since the abandonment of the port.

The ascent to Santiago is so gentle as to be imperceptible, and the cutting and filling will be so slight as scarcely to deserve mention.

Santiago may be regarded as the head of steamboat navigation on the Ulua, although vessels of light draft, at favorable stages of the water, might ascend much further. Lieut. Jeffers, who examined the river minutely, reports that "*steamers drawing seven feet may enter the Ulua at all times; and from June to January ascend as far as the junction of the Humuya. Light draft steamers can always ascend to the mouth of the Humuya, and by the Rio Blanco to a point near Yojoa.*" A consideration of the River Ulua and its dependencies, in reference to their capacities, and the facilities which they will afford in constructing the proposed road, will be found in another connection.

IV.—FROM SANTIAGO, BY VALLEY OF RIO HUMUYA, TO PLAIN OF ESPINO.

FROM Santiago the line of the road is discretionary. It may be located on either bank of the Humuya. A detailed and minute survey can alone determine which bank affords the greatest facilities. Lieut. Jeffers is of opinion that the left, or western, bank is most favorable. In following the left bank, it will be necessary to bridge the Santiago or Venta, a large and broad stream, requiring a bridge from 500 to 700 feet in length; and afterwards to bridge the Blanco, which is narrow, not exceeding 60 feet in width. If, on the other hand, the Ulua is crossed below the junction of the streams, but one bridge will be required. Crossing, however, a larger body of water, it would necessarily require to be of more considerable dimensions than that over the Venta.

Taking either bank, the road would pursue essentially the same direction. The plain continues for about ten miles beyond Santiago, when it is contracted by the hills and mountains which border the comparatively narrow valley of the Humuya. From this point the ascent becomes more rapid. The course of the River Humuya, up to the plain of Espino, is direct, and the

valley, according to Lieut. Jeffers, is "formed between hills of from 50 to 500 feet of altitude, which, in general, come down to the banks of the river, but occasionally recede, and leave strips of level above the reach of inundations. The slopes of these hills are seldom abrupt, and no heavy work will be required at any point. The alternation of cut and fill," he continues, "for the entire distance, is very favorable. The country around is generally broken, but intersected with numerous fertile valleys. This portion is more valuable for grazing than for agricultural purposes. The hills are covered with the pine and oak, and on the borders of the streams exist vast quantities of mahogany, cedar, guanacaste, india rubber, and other valuable trees."

About midway between Santiago and the Plain of Espino, the River Sulaco, descending from the right, unites with the Humuya. This is a considerable stream, draining a broad and fertile valley, and extending in the direction of the rich department of Olancho. The construction of the proposed railroad would lead, not only to the development of the valley of the Sulaco by means of dependent wagon roads through it, but also bring the rich district of Olancho in close communication with the coast, at Puerto Caballos.

The Plain of Espino may be said to commence at the town of Ojos de Agua. This town is fifty-five miles (approximately) from Puerto Caballos, and the valley is here elevated 936 feet above the sea. The average grade of the proposed road to this point will therefore be seventeen feet to the mile.

V.—PLAIN OF ESPINO TO PLAIN OF COMAYAGUA.

FROM Ojos de Agua to the point where a transverse range of hills separates the Plain of Espino from that of Comayagua, there exist no difficulties whatever to the building of the road. A few bridges over small streams, none requiring to be more than thirty feet water-way, are about the only constructions which will be required. The plain of Espino slopes gently toward the north, and lends its aid in overcoming the summit, without involving

any effort of engineering skill. From the upper, or southern, extremity of this plain, there are two ways of reaching the plain of Comayagua, viz.: 1st, by following the valley of Humuya, which here makes a considerable bend to pass the intervening hills; or, 2d, by passing these hills on a direct line, over an intermediate summit of about 150 feet.

The choice between these two lines will be determined, no doubt, by the choice of a pass over the general summit, at the southern extremity of the Plain of Comayagua. If the Pass of Guajoca be adopted, then the line of the river will be selected; if that of Rancho Chiquito be chosen, then the line of the road will be carried directly through the hills, and past the city of Comayagua, the capital of the State.

It may be observed that the Plain of Espino, sometimes called Maniani, is about twelve miles long by eight broad, and surpassingly beautiful. It is stated that, under the crown, traffic was carried on between Maniani and Puerto Caballos in boats. In later times, loaded canoes have descended; and Lieut. Jeffers went down in a canoe from Ojos de Agua. The current of the stream, however, is rapid, and much obstructed by boulders and rocks, making the navigation both difficult and dangerous.

VI.—PLAIN OF COMAYAGUA.

THE great Plain of Comayagua, constituting precisely that feature in the general topography of the country, which gives not only practicability, but eminent feasibility to the proposed enterprise, demands more than a passing notice. It is situated in the very centre of the State, midway between the seas, and is not far from forty miles in greatest length, by from five to fifteen broad. Its greatest or largest axis is north and south, and nearly coincides with the line of the proposed road. These dimensions are exclusive of the lateral or dependent valleys of the streams which concentrate themselves in this basin, and form the Rio Humuya. Like the plain of Espino, it slopes gradually to the north, and thus renders the grade of the proposed road to the summit gentle and easy.

The plain, upon its eastern and western borders, is skirted by mountains five or six thousand feet high, and it consequently enjoys a climate cool, equal, and salubrious, comparing in respect of temperature with the middle States of our Union, in the month of June. The hills and mountains adjacent to the plain are covered with pines, and on their summit and slopes, wheat, potatoes, and other products of the temperate zones, are cultivated, and may be produced in abundance. The productions of the plain, however, are essentially tropical. Its soil is extremely fertile. In short the plain of Comayagua offers all the conditions for attracting and sustaining, as there is abundant evidence that it formerly sustained, a large and flourishing population.

The city of Comayagua (anciently called Valladolid) is situated on the southern border of the plain. It was founded in 1540, by Alonzo Caceres, in obedience to instructions "*to find out an eligible situation for a town midway between the oceans.*" The intention of the founders, as expressed in the following extract from the History of Guatemala by Juarros, seems now about to be realized. He says: "It was intended, by means of this place, to obtain *an easy communication between the Atlantic and Pacific;* its situation being about half way between Puerto Caballos and the Bay of Fonseca, would render it a convenient intermediate depot; the climate being healthy, and the soil fertile, much of the sickness and waste of human life would be prevented; and many of the fatigues and privations avoided that were usually experienced in the journey from Nombre de Dios (Chagres) to Panama."

The city now contains between 7,000 and 8,000 inhabitants. Previous to 1827 it had about 18,000, and was embellished with fountains and monuments. In that year it was taken and burned by the monarchical faction of Guatemala, and has never been able wholly to recover from the shock.

In the maps its position has been put too far to the eastward and southward. It is in Lat. $14^{\circ} 28' N.$, and Long. $87^{\circ} 39' W.$, and in a right line, or within a few miles of a right line, drawn between the mouth of the Ulua and that of the Goascoran. Its distance from the Bay of Fonseca is 70 miles, and it is within a few miles more or less midway between the two seas.

The line of the road across the plain of Comayagua is, as I have said, discretionary, and will depend upon the selection of the summit

pass. Should the pass of Rancho Chiquito be fixed upon, the road would pass through the hills separating the plains of Comayagua and Espino, on nearly a right line, and emerge near the city of Comayagua. Thence on the right bank of the Humuya, to a point near the town of San Antonio, there cross the stream, and proceed on a direct course to the town of Lamani. The plain on the right bank of the Humuya is more broken than on the left, but not to a degree to embarrass the operations of the engineer or constructor.

On the other hand, should the pass of Guajoca be adopted, as I have already said, the road would follow the valley of the river through the hills, a distance of perhaps three miles, enter the plain of Comayagua on the left bank of the river, and traverse the western portion of the plain near, or through the small towns of Lejamine and Ajuterique, the large and flourishing town of Las Piedras, to the village of Tambla. This portion of the plain is wonderfully fertile and favorable for the work. The streams, with a single exception, are small, and exhaustless quarries of blue marble border the line.

It was in the valley of the river, between the hills dividing the two plains, that the surveying party were led to believe, by the representations made to them, the great, if not only, difficulty between the summit and the Atlantic was to be found. There is, however, absolutely no difficulty in the way of a railroad; in fact, there is room for a dozen, at slightly different grades. The hills are high, but not so steep as to preclude cultivation down to the edge of the water, which, in a country of rains, presupposes a declivity not inconvenient for our purposes.

From Ojos de Agua to Lamani, and to Tambla, is a distance of about forty miles. The elevation of Tambla is 1,944, and of Lamani 2,016 feet above the sea. The grade, therefore, from Ojos de Agua to Tambla, the elevation of the latter over the former being 1,008 feet, will be twenty-five feet two inches to the mile. To Lamani the distance would be somewhat greater, and the grade slightly greater in consequence of the intermediate summit of 150 feet, between the plains.

From Puerto Caballos to Tambla the distance may be set down at 90 miles, and the average grade 21 feet 9 inches to the mile.

VII.—THE SUMMIT.

By the summit I mean the section between Tambla or Lamani and Rancho Grande, a distance of nearly fifteen miles—the dividing point, or summit proper, being midway between these two places. It is within this section that the principal, I may almost say the only, engineering difficulties on the whole line are to be found. But these are not of a serious nature, nor are they greater than occur on nearly all roads of equal length in all countries. No tunnels nor deep cuttings are required to pass the summit ; it may be reached from the north by side cuttings, in a friable sand rock, approaching chalk in appearance and texture, and which yields readily to the pick. It can be cut almost as easily as clay, with the advantage of admitting of vertical walls, and not washing.

The summit may be overcome at two passes, neither of which varies the route materially from a right line, viz : the pass of Rancho Chiquito, followed by the mule path, and that of Guajoca.

The summit at the former pass is 392 feet above Lamani, to be overcome in six miles, which gives a grade of 65 feet to the mile. From Rancho Chiquito to Rancho Grande the distance is eight miles, and the descent 500 feet, involving a grade of 62 feet 6 inches to the mile. These are the *maximum* or heaviest grades on the entire road. Nowhere else do they exceed 40 feet to the mile.

The pass of Rancho Chiquito is not a rocky summit, abruptly dividing the waters flowing into the great oceans, but a beautiful valley, a savannah or natural meadow, bounded on the east by a parallel range of high mountains, and on the west by a corresponding range of hills. In this meadow, dotted over with cattle, the traveller finds two bright streams, scarcely a hundred yards apart, flowing in opposite directions. One is a source of the Humuya flowing into the Atlantic, the other of the Goascoran falling into the Pacific. An active spadesman could reverse their directions in a single day.

The pass of Guajoca is lower, by 100 feet, than that of Rancho Chiquito. From the village of Tambla to the summit is about seven and a half miles. The grade necessary to reach it would therefore be but 47 feet 4 inches to the mile. From the summit to Rancho Grande is also between seven and eight miles, with a uniform descent of 55 feet to the mile.

Like that of Rancho Chiquito, the pass of Guajoca is a broad savannah, in which the sources of the Goascoran and Humuya almost mingle. Upon the north side rises abruptly a high continuous ridge, twelve or fifteen hundred feet in height, which extends exactly parallel to the line of the road, and permits, by means of a side cut, precisely such a grade, in approaching the summit from the north, as the locating engineer may find it best to adopt.

In my own judgment, the pass of Guajoca is greatly preferable, in all respects, to that of Rancho Chiquito. Not only is it 100 feet lower to start with, but with an average cutting of 30 feet for a mile, it may be reduced 100 or 125 feet more, so that the extreme rise from Tambla shall not exceed 300 feet. The valley of Cururu, which the line would follow, is bounded by parallel straight ridges, upon the slopes of which any grade may be selected which may be deemed advisable. That is to say, the grade may be carried over three or eight miles, and the road located with a rise of from 40 to 100 feet per mile, in the discretion of the engineer.

As I have said, the road will follow the valley of Cururu to the divide, and thence descend the valley of a small stream, the Carrialzal, to Rancho Grande, where the streams descending from the two passes unite and form the Rio Rancho Grande. Should the cut above contemplated be made, the maximum grade *on the entire line of the road* will fall below 60 feet to the mile, and not exceed 40 feet for a distance of more than six miles.

VIII.—VALLEY OF THE GOASCORAN.

AFTER passing the summit, the line of the road will follow the valley of the Rio Goascoran, to the plains surrounding the Bay of Fonseca. The grade will be very nearly uniform, although averaging higher than on the northern declivity. The character of the country, and the facilities for the construction of the road, are thus summed up by Lieut. Jeffers :

“The country is in general of the most favorable character. The line of the road being traced upon a table on the banks of the river, and beyond the reach of freshets, presents the character of

an inclined plain, from the summit to the harbor. The amount of cutting and filling will be very small, except in the division on each side of the summit; the curves will be good, and the grades not greater than are to be found upon successful roads. There will be no tunnels required, and very little excavation in rock.

"The elevation to be overcome, to pass the summit at Rancho Chiquito, is 2400 feet, but when it is considered that there are no descents, *and that it is the total of ascents, and not the elevation of the summit*, that constitutes the expense of working, it will be seen that this is by no means unfavorable.

"South of Goascoran the formations are of limestone, white sandstone, disintegrated quartz, gravel and sand, mixed with lavas and volcanic stones. No cutting of any extent will be necessary in these rocks. At Goascoran there are extensive beds of blue limestone, and in all the streams an immense quantity of large boulders of granite, gneiss, conglomerate, and sandstone. From this point, the rock is a white sandstone, sufficiently soft to be quarried with the pick, but hardening and toughening by exposure. Its durability is sufficiently proved by the existence of engraved figures upon the rocks near Aramecina, which are in a good state of preservation, although of a date anterior to the conquest. Excavations can be made at an expense little or no greater than in earth, with the advantage of durability, and no liability to wash. Upon the whole line there is abundance of gravel, sand, lime, and brick-clay.

"At Aramecina, the yellow pine appears on the hills, and at San Juan and Aguanqueterique, it is to be found of good size and in inexhaustible quantities, in the immediate vicinity of the road. The pine attains a size of 30 inches, and from 50 to 75 feet of altitude, differing in no respect from the best North Carolina. The oak is also to be found in considerable quantities, as also many other useful and valuable woods in any desirable abundance.

"The width of the valley is so small, compared with its length, that there are no streams to be crossed, between the terminus and the summit, having a water-way to exceed thirty feet: the expense in this important item will consequently be exceedingly small. For the construction of bridges, there is, nevertheless, abundance of timber on the ground.

"The smaller streams running into the Goascoran afford a sup-

ply of water power applicable to the running of saw-mills or other machinery."

IX.—BAY OF FONSECA.

THE magnificent Bay of Fonseca, the western terminus of the proposed road, is beyond dispute the finest port or rather "Constellation of Ports" on the entire Pacific Coast of America. It is fifty miles in length, by about thirty in average width, perfectly protected, and contains two or three large islands, offering inner ports with ample water, and admirable sites for towns and commercial and manufacturing establishments of all kinds. The three States of San Salvador, Honduras and Nicaragua touch upon it. Honduras, however, has far the largest front on the Bay. The port of La Union in the subordinate bay of the same name, is the principal port of San Salvador. Its trade last year amounted to something over \$500,000, and the revenues to about \$100,000. The principal port of Honduras is Amapala, on the Island of Tigre. It is a Free Port, and is rapidly advancing in importance; its population and trade having doubled within the past two years. An American Company has erected on the island a large steam saw, planing, and shingle mill, which is now in active and effective operation. This Company is ready to contract for supplying cross-ties, and lumber of all kinds, for the construction of the Pacific section of the road, and for its various dependent edifices, such as stations, depots, etc.

The precise point of termination on the Bay, will depend upon such considerations as may be disclosed from a careful examination by the Engineers, and by other circumstances. The road may be carried to the Port of San Lorenzo, at the head of the inner bay of that name, which possesses throughout not less than four fathoms of water. This line would run on dry, firm ground, but would involve a bridge of 100 feet in length over the Rio Nacome. By the construction of a short causeway, or one hundred and fifty yards of pile bridging, the road could be conducted upon the large island of Sacate Grande, to a point indicated in the chart, fronting upon a capacious and excellent anchorage. It might

even, with some difficulty, be carried across the northern end of that Island, and be made to terminate on the Island of Tigre, by means of a pile bridge, a mile and a quarter long, over a strait having but six feet depth of water at low tide.

The road can also be brought, without serious difficulty, to a point on the main land fronting on the Bay of Chismuyo, but here it would be necessary to carry out a wharf of considerable length, while at San Lorenzo, Sacate Grande, and Tigre, a wharf or dock of ordinary length would enable the largest steamers to "tie up" beside the depots of the company.

The road could readily be made to terminate at La Union, but as this would involve going into another State, without attaining any object beyond what would be equally secured at the other points named; the fact is not of importance, beyond showing the great facilities which the bay affords for the work in question.

The chart of the Bay of Fonseca, from the survey made by Sir Edward Belcher, under the instructions of the British Government, and published under the authority of the Admiralty, precludes the necessity for any further account of this remarkable bay, which seems to have been marked out by the Creator as the ultimate centre of the commerce of the Pacific. Salubrious, surrounded by a country of illimitable agricultural resources, and with rich and exhaustless coal, gold, and silver mines inland; abounding in fine fish, including excellent oysters, etc., etc.; in short, possessing all the necessities for sustaining a large and prosperous population, the Bay of Fonseca is unrivalled in its adaptation for a terminus of a great work of universal utility, like the one proposed.

Mr. Stephens, in his "Incidents of Travel in Central America," says of it, that it surpasses the *Aegean* Sea, and that its islands are unrivalled in beauty by the boasted isles of Greece.

X.—GRADES.

In the construction, but to a still greater degree in the working of Railways, the matter of grades is a most important considera-

tion. From the preceding statements it will be seen that the first fifty miles of the proposed road will have an average grade of 17 feet to the mile; the next forty miles an average grade of 25 ft. 2 in. to the mile. For the division of fifteen miles crossing the summit, the maximum grade, irrespective of probable lessening of grades by a summit cut, will be 55 feet to the mile, and that only for a short distance. From thence to the Pacific the maximum grade will not exceed 45 feet to the mile. The sum total of ascents and descents, from sea to sea, is 4600 feet, which gives an average grade of a little over 28 feet to the mile. The results are highly favorable, as will be seen from the following comparison:

TABLE OF MAXIMUM GRADES.

Baltimore and Ohio Road, per mile,	-	-	116	feet.
Baltimore and Susquehanna,	"	-	90	"
Boston and Albany,	"	-	89	"
New-York and Erie,	"	-	60	"
Tehuantepec (proposed road),	"	-	64	"
Honduras (proposed road),	"	-	55	"

[The statement of grade at Tehuantepec is irrespective of half a mile of tunnelling.]

The 116 feet grade on the Baltimore and Ohio road is *eight and a half miles long*;* that is to say 986 feet of altitude, or nearly one-half of the sum total of ascents on the proposed Honduras road, are overcome in this short distance. Grades as great as this are of course objectionable; but they are daily becoming less so, with the improvements taking place in locomotive engines.

Hitherto heavy grades have been avoided, at whatever sacrifice, in favor of moderate grades, even when the sum of ascents to be overcome has been the same. In other words, it has been thought that in a road 100 miles long, leading to a summit of 1000 feet of altitude, an average and uniform grade of ten feet per mile for the entire distance, was preferable to 80 miles of level, and 20 of a 50 feet per mile grade. But practically, the latter arrangement

* "On this grade an engine weighing 24 tons, with a traction power of 15,160 lbs., has ascended with a train of loaded cars, weighing, in the aggregate, exclusive of tender, 208 tons, at a speed of from six to eight miles the hour. The same engine ascended the same grade with a passenger train of 118 tons, at the speed of 17 miles the hour."

is said to have been found the best. That is to say, the concentration of grades at one point, compensated by an auxiliary power, is most advantageous, both as regards cost and time.

How far this principle can be applied advantageously, in the line of the proposed road, must be left to the discretion of the engineers to whom its construction may be confided. Fortunately, the nature of the country admits of such discretion. There may be a considerable concentration of grades within ten miles on either side of the summit, by approaching it directly; or the road may be located at the bases of the parallel ranges of hills, on lighter and uniform grades.

XI.—LABOR, MATERIALS, ETC.

NEARLY all the materials necessary for the construction of the road exist on the line. There are inexhaustible quantities of the finest white and blue marble and sandstone, as also of the best pine, oak, and other varieties of useful timber. The country, with the exception, perhaps, of a narrow belt on the northern coast, is eminently cool and salubrious, and proper for the employment of extra-tropical labor. In this latter respect, (that of labor,) the proposed line is remarkably favored; for almost any amount that may be required for the northern division, can be obtained from the mahogany cuttings on the coast. There is, probably, no equal number of men under the tropics, so inured to hard labor and exposure, or so well instructed in precisely the kind of work which we require, as the mahogany cutters. They are, further, thoroughly disciplined, and accustomed to that unity of action so necessary to the prosecution of an enterprise like ours. They are unsurpassed axemen, and expert in the clearing and grading of roads, and construction of bridges.

The truck roads in the mahogany cutting of the Messrs. Follin, on the Ulua, are often several miles in length, thirty feet in width, carefully levelled, grubbed and bridged for the passage of loaded trucks drawn by six yoke of oxen. These roads are constructed by *task work*, at the average rate of about fifty yards per man per day; or say, fifty dollars per mile. The pay of these men is \$15

per month,* and rations ; the latter consisting of a certain amount of flour, and a fixed number of pounds of pork per week. Plantains, which grow in the greatest plenty on the coast, are substituted, to a considerable extent, for flour. The huts which the men occupy are constructed on the spot, and are made of poles or canes, covered with palm leaves, and seldom require more than half a day in building. A hammock swung from one corner to the other, a couple of stones to support the cooking utensils, and the habitation of the workman is complete. He has few artificial wants, and no winter to provide against, or to interrupt his labors. All he requires is a covering to protect him from the sun and the rain.

There is no doubt that the labor requisite to carry the road from the coast to the plains of the interior, can all be obtained from this source. In the interior, and on the Pacific section, northern laborers can work with equal facility and less danger from the necessary exposure, than in the United States. The greater part of the population of Central America exists on the Pacific coast, and on that division, therefore, a large supply of labor could be relied upon, from the States of San Salvador and Nicaragua, and from Honduras itself. Upon this point I am supported by the opinion of Lieut. Jeffers, who says that on this portion of the line, "native labor can be obtained from this [Honduras] and the adjoining States in sufficient quantity ; and, at the rate of wages, (twenty-five cents per day,) it would be very useful. There can, however, be no difficulty in introducing foreign labor, and its employment will be more satisfactory."

After passing the plain of Sula, the country is very open, with frequent savannahs. The pine and oak forests are seldom so dense as to prevent the explorer from riding freely in all directions. The location of the road, therefore, for two-thirds of its length, will be comparatively easy ; and for this distance also, the cost of clearing and grubbing will be much diminished.

Reverting to the climate, I can only repeat what I have already written on the subject, from the country itself. "I do not believe there is a more healthful, and there certainly is no more agreeable climate in the world, than that of Honduras in general. In this

* One half of this is now paid in goods, at high rates. If the wages were paid wholly in cash, they would rule considerably lower—say at \$13.

respect, the country surpasses the best parts of Italy. The Pacific coast is superior to that of the Atlantic in respect of health, and settlers might establish themselves around the glorious Bay of Fonseca, with no more risk than would attend any change of climate. Amongst temperate, cleanly people, all other circumstances being equal, I have no doubt the average of life would be ten years longer on that coast and in the interior of the country, than in New-York. In the first place, pulmonary complaints, and that large and fatal class of diseases resulting from colds and sudden changes of temperature, are here nearly or quite unknown. Intermittent fevers are less common than in our Western States, and yield more readily to the usual medicines. They are, after all, pretty much confined to persons of irregular habits, who disregard the precautions necessary to health in any climate. I have, for two years, undergone almost every kind of exposure and fatigue here; yet I have enjoyed uninterrupted good health—far better than I could have hoped for at home, under similar circumstances."

XII.—CLIMATE AND TEMPERATURE.

THE temperature on the line of the road is, of course, highest at its extremities. But the high temperature of the coast does not hold far inland. The modifying influence of the neighboring mountains is felt, even before the increased altitude begins to have its natural effect. The temperature of Comayagua may be taken as approximately that of the entire line between the town of San Pedro Sula on the north, and that of Goascoran on the south—that is to say, of about three-fourths of the entire line. At Comayagua, my observations gave the following results:—

MEAN RANGE OF THERMOMETER AT COMAYAGUA.

MONTHS (1853).	6 A. M.	12 M.	3 P. M.	6 P. M.
April (part),	75° 7'	81° 9'	84° 0'	80° 2'
May,	75° 5'	81° 2'	80° 3'	78° 5'
June,	74° 4'	78° 5'	80° 8'	78° 3'
Average, .	75° 2'	80° 5'	81° 7'	79° 0'

That is to say, during the above months, the mean temperature, from six o'clock in the morning until the same hour in the evening, was $79^{\circ} 1'$. The highest or maximum points touched by the thermometer during these months was 88° ; the lowest, or minimum, 68° ; an extreme range of 20° . It may be observed here that, from certain peculiarities of the position of Comayagua, its temperature rules higher than in any other portion of the valley or plain in which it is situated. The temperature of Las Piedras and of San Antonio, distant twelve or fourteen miles, has a mean of from three to five degrees lower. A little place called "El Sitio," not twenty minutes' ride from Comayagua, and not perceptibly higher, has a mean of at least five degrees less.

It should also be borne in mind, that in the interior, the months of April, May, and June are the hottest of the year, and that for the remaining nine months, the temperature is considerably lower. November, December, and January are positively cool, and fires sometimes become necessary for comfort.

The table lands bordering the line of the proposed route vary in temperature according to their elevation, and afford a variety of climate adapted to every caprice, and a temperature suitable for the cultivation of every product of every zone.

We have no continuous record of thermometrical observations at Puerto Caballos, nor what would be about the same thing, at Omoa. This deficiency, however, is very well supplied by the results of such observations for an entire year, at the mouth of Black River, which, being on the same coast and in the same latitude, cannot differ materially from Puerto Caballos in respect of temperature. These observations are given by Mr. Thomas Wright, who remarks that "the climate here is pretty equable, only varying, throughout the year, from 62° to 86° Fah., so that nothing need be apprehended from excessive heats, especially as, during the greater part of the year, it is tempered by the grateful sea breeze, and sometimes by the invigorating dry north wind. The following is a summary of the thermometrical observations taken at this point, daily *at noon*, for twelve months :

SUMMARY OF THERMOMETRICAL OBSERVATIONS

Taken daily at noon, at the mouth of Black River, Honduras, for One Year.

MONTHS.	AV. TEMP.	PREVAILING WINDS.	P. REVA IL LING WEATHER.	WET: sometimes fine by being a dry north.	
				Do.	do.
January,	62° to 66°	Northers.			
February,	66° to 70°	"			
March,	70° to 74°	Unsettled sea breezes and Northeasters.	Dry.		
April,	74° to 76°	Northeasters and sea breezes.	Do.		
May,	78°	Strong sea breezes.	Do.		
June,	78° to 82°	" " "	Do.		
July,	82°	" " "	Wet.		
August,	84° to 86°	Light variable airs or calms.	Dry,		
September,	84° to 86°	" " " "	Do.		
October,	78°	Sea breezes, sometimes a light North.	Dry or wet according to wind.		
November,	72° and less	Northers.	Wet: sometimes fine by being a dry north.		
December,	62° to 66°	"	Wet.		

For one week, from the 5th to the 12th of July, 1853, the thermometer at Omoa had an average of 85° Fah. at noon ; its greatest range, from six o'clock in the morning to the same hour in the evening, having been from 80° to 87°. During this period, the mornings were generally very pleasant, with frequent showers from nine to twelve. The sea breeze set in between twelve and one, and from that time until six in the evening it was clear. During the evening and night, the land breeze was accompanied with frequent violent showers.

The town of Sta Rosa, in the department of Gracias, is situated about 3400 feet above the sea. Here, for three weeks during the month of July, 1853, the thermometer exhibited the following results :

Maximum,	- - - - -	75°	Fah.
Minimum,	- - - - -	68°	"
Mean average,	- - - - -	71° 15'	"

But July is not amongst the coolest months of the year. In November, December, January, and February, the cold is decided, and sometimes uncomfortable.

The city of San Salvador, capital of the State of the same name, is situated on an elevated plain or plateau of the Pacific coast range of mountains, at an elevation of 2110 feet above the sea. The month of August, 1853, gave the following thermometrical results :

Maximum,	- - - - -	81°	Fah.
Minimum,	- - - - -	70°	"
Mean average,	- - - - -	76° 3'	"

Our observations on temperature at other points were too few to be of much value ; but the following facts may serve to illustrate the variety of temperature in Honduras.

TEGUCIGALPA, 3420 feet elevation ; for four days, from April 28 to May 4, 1853, inclusive :

Maximum,	- - - - -	85°	Fah.
Minimum,	- - - - -	68°	"
Mean average,	- - - - -	77° 5'	"

GUAJIQUERO, (Indian town,) 5265 feet elevation, May 4, 1853,
six o'clock A. M., 56° Fah.

INTIBUCAT, 4950 elevation, July 4, 1853, six o'clock A. M., 56°;
eleven o'clock A. M., 62°.

GRACIAS, 2520 feet elevation :

July 6, 1853,	12	M.	-	-	-	78°	Fah.
" "	"	7½ P. M.	-	-	-	75°	"
July 7,	"	6 A. M.	-	-	-	72°	"
" "	"	9 "	-	-	-	75°	"
" "	"	2 P. M.	-	-	-	79°	"
" "	"	6 "	-	-	-	76°	"
July 8,	"	5 A. M.	-	-	-	70° 5'	"

XIII.—RESOURCES ON THE LINE OF ROAD.

Apart from the rich agricultural resources of the country through which the proposed road will pass, embracing every variety of tropical staple, coffee, cochineal, cotton, cocoa, sugar, rice, tobacco, indigo, maize, etc., there are other vast and undeveloped sources of wealth. The valley of the Ulua abounds in valuable and precious woods, and the hills and mountains of the interior contain numberless mines of the precious metals. There is hardly a stream on the Atlantic slope of the Cordilleras which does not carry gold in greater or less quantity. Recent examinations have shown that the sands of particular streams fully equal the placers of California, in the extent and value of their yield. The silver mines of the interior, however, are unsurpassed in the amount and richness of their ores, and there is reason to believe, with the intelligence, enterprise, industry, and capital which will inevitably flow into the country, with the prosecution of the railway, that Honduras will become, in proportion to its territorial extent, the largest silver-producing country in the world. In fact, up to this time, the mining interest of the State has been greater than all others; and under the crown as much as \$3,000,000 were annually exported from the northern ports of the province. Other metals, such as

iron, copper, and lead, are also abundant, and require nothing more than the opening of roads for the transportation of machinery, etc., to become important items in the productive wealth of the country.

Coal is also found at various places in the State, and two large fields occur on the lands which have been ceded to the Company. The quality is good, it is easily worked, and in both cases it falls within a few miles of the line of the road. It can be supplied to the steamers of the Company with facility, and can be exported to any point on the Pacific which may be desired. A bed of coal which I examined, in the plain of Sensenti, Department of Gracias, covers a large area, and is ten feet in thickness. In this department are valuable mines of opals, and cinnabar and asbestos are also reported to exist.

In the enumeration of the products of the State, hitherto neglected, I may mention sarsaparilla, gum copal, India-rubber, gum arabic, fustic, dragon's blood, vanilla, Brazil wood, liquid amber, Peruvian bark, quinine, etc., etc. Cattle are numerous in the State, and constitute a considerable part of the wealth of the inhabitants. Hides, therefore, which hardly pay to be carried to the coast on mules, will become an important article of export, when new and cheap means of transportation are established.

Altogether the establishment of regular communication with Honduras, and between its ports and the interior, will open to the world a rich and virgin field for the industrious and enterprising; create new markets for our manufactures; afford additional supplies for our use, and give a corresponding impulse to commerce and trade.

XIV.—INTERIOR NAVIGATION.

THE capabilities of the rivers of Honduras, coinciding in their course with the line of the proposed road, for purposes of accessory and general navigation, have been incidentally alluded to in the foregoing paragraphs. As will be seen by the Sketch Map of the line of the road, accompanying these notes, that the large river Ulua, and the smaller Rio Goascoran, run parallel to the projected

road. The first may now be navigated by steamers for a distance of upwards of 60 miles from its mouth, and to a point within 95 miles of the Bay of Fonseca. The latter, with some improvements, may be made to serve a useful purpose in the rafting of timber, and the transportation of materials of construction.

In respect to the Rio Ulua, Lieut. Jeffers observes :

“The mouth of the river Ulua is obstructed by a bar, having at this time but nine feet of water upon it; it may be said to be impassable for sailing vessels, as the outset is so strong that a fresh breeze is required to enable them to stem the current, and with a fresh breeze the sea is very heavy. *Steamers drawing seven feet may enter at all times; and, from June to January, ascend as far as the junction of the Humuya.*

“At any time between March and December, ships may, and do, anchor off the mouth of the river Ulua, loading mahogany. There is, however, a cove about one mile to the westward, where a landing may be better effected, and at all times, except during the continuance of the northerns. *From this landing to the river, the distance is but about two hundred and fifty yards, and a light draft steamer can, from this point, always ascend to the mouth of the Humuya, or, by the Rio Blanco, to a point near Yojoa.*

“The Ulua can be used as accessory, and in the construction of the road, may be of essential service; *it can be navigated by a light draft steamer at all seasons, as far as the junction of the rivers;* and the Humuya, for several months, as far as the mouth of the Sulaco, but beyond that point the river cannot be made of service except in rafting down timber. The numerous rapids, sudden rise and temporary duration of the floods, and the character of the bottom, composed entirely of sharp rocks, forbid all hopes of improvement in the upper part of the river.”

The Venta or Santiago river, which is the largest tributary of the Ulua, and which reaches into the rich departments of Santa Barbara and Gracias, can be navigated to some extent, as it is also possible the Chamelicon may be, at certain stages of the water. At any rate, the valleys of these streams offer advantageous means of communication with the departments above named, by improved cart or plank roads, for the construction of which all requisite materials are abundant on the spot.

In respect to the Goascoran, Lieut. Jeffers observes :

"The Goascoran may be made available as a means of transport in the winter, or rather rainy season ; and, with some improvements, at *all* seasons. The mouth of this stream is obstructed by a sand bar, but may be entered on the tide at a quarter flood : this bar may be removed by dredging. Above these are obstructions, caused by natural dams of large boulders : by removing these boulders from the centre of the river, we can create a series of ponds and sluices, forming a slack-water navigation as far as Cardad, probably to San Juan. For the purpose of rafting timber from above, should it be required, and transporting materials in boats, the river will be very serviceable."

Notwithstanding the facilities which the Ulua and other rivers may offer for navigation, it is not the purpose of the Company to use them except as accessories in the construction of the road, in which respect they will be of great value. Frequent transhipments are inadmissible in any route of Interoceanic Communication looking to permanence.

Two-thirds of the annoyance, to say nothing of the extortion and expense, of a California voyage, *via* Panama, consists in the landing, by means of small boats, at Chagres, the subsequent change to boats on the river, or to the cars on the railroad ; a third change to mules ; and finally a fourth change to small boats, and a row of some miles to reach the steamers in Panama Bay. It is quite as bad, if not worse, by way of Nicaragua. Passengers shift from the ocean steamers to the little river boats in the harbor of San Juan ; in these they ascend to the Castillo rapids, where there is a portage, and then another boat carries them to the Toro rapids, where they have to take to the woods again to reach the lake steamers, which land them at Virgin Bay, from whence they take mules to San Juan del Sur. At Tehuantepec, if the Sloo arrangement is carried out, passengers must first go to that graveyard of Europeans and Americans, Vera Cruz ; from there the contract stipulates they must go in vessels, under the Mexican flag, to Coatzacoalcos ; disembarking there, they will go over land to Tehuantepec, where the difficulties of reaching the Pacific steamers will be quite as great as they are at Panama ; and after all this, the steamer must touch at Acapulco.

On the proposed road all these delays and annoyances will be avoided ; for both in Puerto Caballos and at Sacate Grande, by

the construction of ordinary wharves, the steamers may *tie up* beside the depots of the road. All other circumstances being equal, this alone would be sufficient to decide the travelling public in favor of the Honduras line.

XV.—SUMMARY OF CHARTER.

THE Charter of the Honduras Interoceanic Railway Company, signed by the Commissioners of the State and the Company, June 23, 1854, was ratified by the Legislature of Honduras, and proclaimed by the President of that Republic, April 28, 1854. It is far more liberal in its provisions than any charter ever conceded for any similar purpose, and moreover places the relations between the Company and the State on a basis so plain and simple, and withal so mutually advantageous, as almost to preclude the possibility of difficulty or misunderstanding arising between them. The following is a rapid summary of its provisions:

SECTION I

Concedes to the Company the exclusive right for an interoceanic communication, by water or railway, through the territories of Honduras; and gives to the Company all lands and natural materials necessary for the purpose. Eight years from the date of the ratification of the contract are conceded for the completion of the work, with privilege of extension in case of interruption from natural or unforeseen causes. The charter is for *seventy years* from the completion of the work proposed, at the end of which time the State may purchase the road, at a fair valuation, or extend the charter, in its discretion.

SECTION II

Provides that the Company shall have free passage over all lands, public or private, and concedes to the Company a space of two hundred yards on each side of the line of the road; free use

of all timber, stone, or other natural materials ; free use of all the rivers and harbors of the State ; and free introduction of all machines, instruments, provisions, and other materials for the construction and use of the road. Native laborers employed on the road are exempt from civil or military service. The Company has the right to constitute itself a Stock Company, etc., and all of its rights, interests, and property are permanently exempt from taxation or other charge.

SECTION III

Provides that the Company shall pay to the State the sum of One Dollar for each through passenger over ten years of age. The Company will receive the labor of convicts from the State on equitable terms, and agrees to fix the rates for interior transit and trade on the lowest terms consistent with its interests.

SECTION IV

Provides that the citizens of the United States, and of all nations at peace with Honduras, shall pass over the route free of all taxes and charges, and without the requisition of passports. All goods and merchandise, *in transitu*, shall also pass free of charges on the part of the State, with the exception of a nominal sum for registry, to be paid by the Company. Baggage of passengers to pass without examination or charge of any kind.

SECTION V

Makes a gift to the Company of 4000 caballerias of land, which, as the caballeria is fixed by law at 160 acres, equals 640,000 acres, or 1000 square miles. The Company has also the exclusive right to purchase and locate on the line of the road or elsewhere, an additional 5000 caballerias, (800,000 acres,) at twelve and a half cents the acre, payable in the stock of the Company, at par. All persons settling on the lands of the Company are entitled to all the rights and privileges of native-born citizens of the State, and are exempt for ten years from all kinds of taxes, and all civil or military service, except with their own consent.

SECTION VI

Stipulates that the ports at the extremities of the road shall be *Free Ports*. A commission of five persons, two named by the Company and two by the State, who shall jointly elect a fifth, to constitute a "Tribunal of Reference," to frame all necessary rules and regulations for carrying out the Charter in its letter and spirit, and to decide finally and without appeal all disputes which may arise between the State and Company. The Government of Honduras to open negotiations with the leading maritime nations, for the guarantee of the perpetual neutrality of the proposed route, in accordance with the Convention of Washington, July 5, 1850. The Company to have the right to construct Magnetic Telegraphs. The Government gives a bounty of fifty acres of land to each unmarried, and of seventy-five acres to each married laborer, who shall come to Honduras to work on the road, and who shall declare his intention to become a citizen.

In addition to this, the Railway Company constitutes the "*Honduras Steamship and Navigation Company*," with the privilege of "ingress, egress, and passage to, from, and through the harbors, rivers, and waters of the State, free of all duties and charges of every kind."

XVI.—COMPARISON OF Isthmus Routes, IN RESPECT OF DISTANCE.

TIME, not *distance*, is the true measure of the relations between places. If the traveller can go from New-York to Philadelphia in two hours, it is of little consequence whether the distance is fifty or five hundred miles.

The saving of time, of course, depends more or less on the distance to be traversed, and hence a shortening of distance must always be an important element in calculating the advantages of the respective routes which have been proposed between the Atlantic States and California. But this is only one element. Good ports, where vessels may embark and disembark their freight and passengers with rapidity, at proper wharves, instead of through the

means of small boats and lighters, is another important element to be considered, not only in respect of economy of time, but in respect also of convenience, cost, and security. Another element is the possession of easily accessible ports, and a general sailing course free from opposing periodical winds, and other similar detaining and obstructing causes. And still another element, and one of primary importance, is the avoidance of harassing delays resulting from frequent transhipments. These not only consume time, but are fruitful in annoyance, and are a constant occasion of dread to the traveller. As I have already said, "frequent transhipments are inadmissible in any route of interoceanic communication looking to permanence."

I unhesitatingly claim for the proposed route, *via* Honduras, in respect not only of distance, but in freedom from detentions and delays resulting from bad ports, adverse winds, and frequent changes, a clear and emphatic superiority over all routes which have been proposed across the Central American Isthmus. In respect of sailing distances, the following letter from Lieut. MAURY must be received as conclusive :

NATIONAL OBSERVATORY,
Washington, June 26, 1854.

E. G. SQUIER, Esq.

Sir :—In reply to your note, requesting to know the sailing distance from New-York to San Francisco, *via* the various Isthmus routes :

You are aware that these distances cannot be accurately stated, unless from more accurate charts than we now have. I suppose you do not want the distances stated except from port to port, exclusive of the distance to be run after the vessel crosses the bar or enters the harbor. I therefore send you the shortest steaming distance, from port to port, in round numbers.

From New-York to San Francisco, <i>via</i> Panama,	5200 miles.
" " " " " Nicaragua,	4700 "
" " " " " Honduras,	4200 "
" " " " " Vera Cruz and Tehuantepec,	4200 "

No allowance is made in the above for the distance across the continent.

Respectfully yours,

M. F. MAURY.

The distance across the continent at Panama is 54 statute miles, at Nicaragua 184, at Honduras 160, at Tehuantepec 169. Accordingly, the total distances are, from New-York to San Francisco, *via* Panama, 5254 miles; Nicaragua, 4884 miles; Honduras, 4360 miles; Tehuantepec, 4369 miles.

But it is also to be considered that the *shortest steaming course* is not always a practicable one. Thus, after passing the Capes of Florida, steamers cannot safely steer direct for Vera Cruz. They must keep well to the northward, to avoid the dangerous reefs, shoals, and low islands which embarrass the great Campeachy Bank, to the north of Yucatan. This *detour* augments the sailing distance between New-York and Tehuantepec several hundred miles, and thus increases the relative superiority, in respect of distance, of the proposed Honduras route.

XVII.—COMPARISON OF Isthmus Routes in Respect to Ports.

"It is necessary to remark further, that irrespective of climate and political considerations, there is one chief requisite, one main point to be insisted on, in connection with any route or line intended to be available for general utility, without which, permanent success will be impossible. This indispensable adjunct is a *good port*. Without such a place of resort at *each end* of any canal or railway, easy of access, and sheltered at all times, shipping could not effect objects securely, and in definite times. Delay expense, and risk must be the consequence of using a route unprovided with adequate harborage."—CAPT. FITZROY, R. N., *Journal Royal Geographical Soc.*, vol. xx., p. 165.

In order to institute a fair and impartial comparison between the various interoceanic routes proposed or in actual operation, we must first inquire what are the purposes of each. Taking them in their order, Tehuantepec, Honduras, and Panama are claimed to be proper and feasible points for railways; Nicaragua and Atrato for canal communications. We here leave out the Chiriqui and Darien lines as exploded and impracticable. Nicaragua is simply impracticable for a railway; that is to say for a continuous

road, leading from one ocean to the other. A road built up the valley of the San Juan river would require to be constructed through an unbroken wilderness, and moreover, to be 119 miles in length. And even then a change to boats would become requisite to pass the lake, (which cannot be turned,) with a resumption of land travel on the other side. The geographical position of the Atrato line, to say nothing of its proximity to the railway at Panama, renders a railway there unnecessary and valueless. The question of ports then, as regards Atrato and Nicaragua, is of no consequence. It may nevertheless be observed that both are exceedingly defective in this respect. The present line of transit at Nicaragua has absolutely no port on the Pacific; and an adequate terminus on that sea cannot be found short of the port of Realejo, a distance of upwards of 300 miles from San Juan de Nicaragua. The Atrato route labors under the same disadvantage on the Pacific, Cupica being small and exposed to the S. W.; while on the Atlantic the Atrato river has a bad bar, with only five feet of water.

Nor is it necessary, in this connection, to give much consideration to Panama. Its Atlantic terminus is not less than 7 degrees of latitude to the southward of the corresponding terminus of the Honduras line, while its Pacific terminus is not less than four days' sailing distance below the latitude of the corresponding terminus of the Honduras line. Supposing all other circumstances to be equal, the saving in distance of the Honduras over the Panama line, would decide the question of superiority immensely in its favor. But Panama has bad ports on both sides; bad in respect to climate, and if not absolutely unsafe on the Atlantic, certainly inadequate; while on the Pacific the Bay of Panama, where vessels are compelled to lie several miles from the shore, can hardly be called a port. The time lost in effecting embarkation and disembarkation there, by means of small boats, to say nothing of the expense, annoyance, and danger, must always be a serious drawback.

It follows then, that the routes which in respect of latitude, and consequent saving of distance, can bear a comparison with each other, are those of Honduras and Tehuantepec. In this respect, these are the only ones which meet the obvious requirements of commerce and travel. And here the general reader must bear in mind, that above latitude 14° N., the continent does not run north

and south, but nearly east and west. The proposed northern terminus at Tehuantepec is in Lat. $18^{\circ} 8'$ N.; that of Honduras in Lat. $15^{\circ} 49'$ N.; the southern termini in lat. $16^{\circ} 12'$ and $13^{\circ} 21'$ N. respectively. The absolute difference in latitude is, therefore, but $2^{\circ} 19'$; and although Tehuantepec is in Lon. $94^{\circ} 30'$ W., and Honduras in Lon. $87^{\circ} 57'$ W., it is immaterial, in the voyage from New-York to San Francisco, for instance, whether the *westing* is made in the Gulf of Mexico or the Pacific—except perhaps that the Pacific is a smoother sea than the Gulf, and that it could be made in the first quicker and more easily than in the latter.

It would appear then that Tehuantepec has an absolute advantage over Honduras of $2^{\circ} 19'$ of latitude, equal to $4^{\circ} 38'$, or 270 nautical miles in the whole voyage, as between New-York and San Francisco. But this *apparent advantage* is lost in consequence of certain difficulties in the navigation of the Gulf of Mexico, and of certain requirements in the only charter for a Railway at Tehuantepec, which may be regarded as having any vitality for the present, viz.: that of “la Compañía Mista,” or “Sloo Grant.” This charter provides that the steamers running in connection with the proposed Tehuantepec road must sail to Vera Cruz, and that there all passengers and freight must be transhipped in Mexican bottoms, before going to the Isthmus. Subjoined is the provision in question :

“ART. III. The Company is obliged to establish a line of steamers, sufficient for the service of the route of communication, under the Mexican flag, in accordance with the laws of the country, to run between Vera Cruz and the point in the Rio Coatzacoalcos, where the railroad shall commence.”

Vera Cruz is established as the only port of entry on the Gulf. Apart from all the detention which this transhipment involves,—the fatality of the climate of Vera Cruz, and the insecurity of its harbor,*—all steamers from the Atlantic States must give the great bank of Campeachy, with its thousand reefs and low islands, a wide berth, by keeping far to the northward. They cannot, as I have already said, safely steer in a right line, from the straits of Florida for Vera Cruz, but must make a circuit to avoid the Alacranes and other dangerous impediments to navigation to the

* “Vera Cruz does not even deserve the name of *roadstead*; it is a disagreeable anchorage amongst shallows.”—HUMBOLDT, *New Spain*, vol. i. p. 2.

north of Yucatan, upon which the British West India Steamship Company lost a number of their best vessels, until strict orders were given to have them keep well to the northward of the Campeachy bank.

Calculating the deflection from this cause, and the increase of distance involved in going to Vera Cruz, not only is the apparent advantage in favor of Tehuantepec over Honduras lost, but the aggregate distance is so much increased as to give *an absolute advantage to Honduras of more than two hundred miles.*

We now come to the question of ports, upon which Captain Fitzroy, in the quotation at the head of this section, has laid a stress which all who have investigated the subject know is none too emphatic. To avoid any imputation of unfairness in this matter, which is necessarily one of testimony, we shall content ourselves with quoting from authorities not open to suspicion, whose impartiality cannot be called in question, and who establish the fact that Tehuantepec has no ports worthy of the name on either sea. In respect to the Pacific terminus:

"The port of Tehuantepec is not more favored by nature [than the coast of Nicaragua]. It gives its name to the hurricanes which blow from the N.W., and which prevent vessels from landing at the small ports of Sabinas and *Ventosa*" [*Anglice*, "the windy"].—HUMBOLDT, *New Spain*, vol. i. p. 26.

Referring to Tehuantepec, M. Michel Chevalier observes, in his work on Interoceanic Communications, that—

"It would be necessary to remedy, if possible, the *want of a moderately convenient port* on the Pacific. Tehuantepec scarcely deserves the name of roadstead; the sea recedes day by day from its shores, the anchorage yearly becomes worse; the sand deposited by the Chimalapa increases the height and extent of the bars of sand at the entrance of the first lake, in the second, and thence into the sea, and already is Tehuantepec accessible to small vessels only."

In fact, the plan of employing what is called the port of Tehuantepec, was formally abandoned by the engineers of the Tehuantepec survey. They propose to create an artificial port at Ventosa, by the construction of a "breakwater 2000 feet long." The difficulty, not to say impossibility, of constructing artificial harbors to meet any important purpose, is too obvious and well understood to require remark.

In one word, Tehuantepec has absolutely no port on the Pacific. It is even less favored on the Atlantic; nor is it claimed that there is here the *remotest resemblance* of what is understood by a port.

This deficiency is proposed to be supplied by entering the Coatzacoalcos river, which is without shelter at its mouth, and which flows directly into the open sea. It has, moreover, a bar, which in bad weather would be impassable for vessels of a hundred tons. "*At high water, on the full and change, the depth of water on the bar is about 13 feet, and falls as low as 11 feet,*" is the confession of those who have identified themselves with the Tehuantepec project.* Upon this point the authority of Gen. Orbegoso, who was first employed by Sr. Garay to examine the Isthmus of Tehuantepec, cannot be accepted. He reported 21 to 23 feet on the bar, while the engineers of the Tehuantepec Co. found but from 11 to 13, and Commodore Perry but 12 feet. Sr. Moro seems to have been of the same school. He reported 23 feet on the bar at Boca Barra, at Tehuantepec, where the authority of the Tehuantepec report found but eight feet! Nevertheless, proceeding upon the erroneous assumption that the Coatzacoalcos carries 18 feet at its bar instead of 10 to 13, Capt. Liot, Superintendent of the British West India steamers, observes:

"The soundings given in the preceding remarks (even those most favorable to the Tehuantepec project) are evidently insufficient for large vessels with full cargoes; for although the principal channel of the bar were always to maintain a depth of 18 feet, (as Sr. Orbegoso asserts it does, but afterwards admits that 'under extraordinary circumstances perhaps it does not,') how is a ship of 600 tons burthen, for instance, (drawing 18 feet water at least,) to pass it? If there were much swell on the bar, it would be perilous for vessels of even 15 feet draft to attempt it. Thus, then, this projected ship canal would avail only for vessels of and under 300 tons burthen, and in the season of 'Norths' great risk would attend their approach to that part of the coast, where there is neither port nor shelter nearer than Vera Cruz, (120 miles upon a northwest bearing from the bar of the Coatzacoalcos;) and during 'Norths' the land threabouts is not only a 'dead lee shore', but it forms a perfect '*cul de sac*' out of which sailing vessels could not escape under canvas, except by risking the passage of the bar, (which shifts,) and that they would scarcely dare without a pilot; during a hard north, moreover,

* Tehuantepec Survey, p. 115.

the surf on the coast is so heavy, that pilots are unable to ‘board’ vessels, whatever their distress or danger may be.”

Col. ABERT, of the Topographical Bureau, in a review of the Transits published by Congress, observes :

“The gulf bar cannot be considered as affording more than 12 feet of water. *Upon the Pacific side there is no harbor.* . . . Tehuantepec bay is represented as shoal and much exposed, dangerous, and subject to frequent tempests.”

Com. SHUBRICK, commanding the Pacific Squadron, in a letter to the Secretary of the Navy, dated Oct. 7, 1847, says :

“There is, I understand, anchorage in the Bay of Tenuantepc; but all accounts agree with the letters of Mr. Forbes in describing it as exceedingly boisterous. Capt. Hall says the hardest gales he ever experienced were in that bay, and the Spanish call it Ventosa.”

Again, Mr. J. H. Alexander, in a communication on the subject to the special Congress Committee :

“What was said just now as to the defects of the harbor of San Juan del Sur, in connection with the Nicaragua route, applies also to the consideration of another, which has attracted much attention; I mean that over the Isthmus of Tehuantepec. . . . In regard to the approaches on either side, Nature has been unkind; and Ventosa bay, on the Pacific, is in its very name (‘the Windy’) an apt expression for the character of the roadstead; while on the Coatzacoalcos side, there is nothing to protect the entrance of that river from the northerns of the Gulf of Mexico.”—J. H. ALEXANDER, *Congressional Report*, No. 145, 1849, p. 44.

Lieut. Col. Geo. W. Hughes of the U. S. Topographical Engineers, in a letter to the Secretary of State, on the subject of “Inter-marine Communications,” sums up his account of Tehuantepec in the following words :

“One most serious objection to any communication across this isthmus for great commercial purposes, is to be found in the want of safe and capacious harbors at either terminus. At the mouth of the Coatzacoalcos there is but twelve and a half feet water at low tide, and it is exposed to the full

force of the northers which prevail from November till April. *I have seen thirty ships stranded in a single norther in the month of March.* It may be said that the bar may be removed and an artificial harbor constructed at the mouth of the river. There is probably no more difficult problem in the science of engineering than the execution of such works under the best of circumstances; but I am far from asserting that skill and *money* may not accomplish them. The mouth of the Coatzacoalcos is peculiarly ill adapted to such improvements, which would scarcely be inferior in magnitude to the harbor of Cherbourg, and would assuredly require the munificence and resources of a Louis XIV. for their execution. The bar, created by the action of a certain natural law, would, if removed, be immediately re-formed by the same cause to which it owes its origin, unless that cause should be so modified as to direct elsewhere the deposition of earthy matter; and in the present case the question would be further complicated by the silting up of the artificial harbor, if one should be built. Supposing that such a harbor should be constructed, it would still be liable to the objection of the difficulty and danger of access, especially for sail vessels, in the season of northers. . . . The whole shore of Tehuantepec is subject to the visitation of terrific hurricanes, (which take their name from the Isthmus,) sweeping with resistless fury along this inhospitable coast, where the tempest-tossed mariner seeks in vain for a harbor of refuge, even for the smallest class of sea-going vessels. For this there seems to be no remedy; the genius of man cannot control the storms, and nature is constantly interposing new physical difficulties in the way of navigation."

Mr. Pitman, in his work on the Practicability of an Interoceanic Communication, (p. 204,) arrives at a precisely similar conclusion :

"The prevailing weight of all extant authority shows that the mouth of the river Coatzacoalcos is not a sufficiently good port; that there is not a port at the mouth of the river Tehuantepec capable of receiving ships of considerable tonnage, and that there is no [means of making the present port better. . . . From all these considerations, in addition to the before-mentioned reasons, it seems to be an unavoidable conclusion that the proposed route is *unfit*, if not impracticable, for a ship navigation that would be adequate to extensive commerce."

As has already been observed, it has been proposed to remedy the deficiency of a port on the Pacific, by the construction of an artificial harbor. To this end it is designed to carry out a breakwater 2000 feet long, to a depth of 36 feet. It is only necessary to

look at the annual Congressional appropriations for breakwaters, on our own coast, apart from their original cost, and to consider their comparative inadequacy, in order to estimate the practical value of this proposition.

The official survey of the entrance of the Rio Coatzacoalcos by Com. Perry, published by the Government, shows but 12 feet of water on the bar, in a channel but 150 feet wide. Outside of the channel the water shoals to 11, 10, and 9 feet.

Experience has shown that the vessels, employed in the California transit, require the highest admissible tonnage, in order to give the requisite capacity and accommodation. The vessels which have been most profitable are the Ohio, Georgia, Illinois, etc., each having a capacity of upwards of 3000 tons. The Falcon, one of the smallest of the ocean-going steamers, and too small for a profitable passenger vessel, carries 750 tons, and draws 15 feet of water, or *three feet more than the total depth of water on the Coatzacoalcos bar!* Tehuantepec, therefore, lacks the essential requisite of good ports: it has none worthy of the name, or capable of meeting the ordinary conditions of an interoceanic transit, on either sea. It would be difficult, if not impossible, to find in the Gulf of Mexico, or any where else on the whole Atlantic coast of America, a more dangerous point, or one less suited for a terminus of a route of communication across the continent, than Tehuantepec. The northers sweeping down the great valley of the Mississippi, have here their greatest force and influence; and, as observed by Capt. Liot, no steamer or other vessel, of ordinary sea-draft, could cross the Coatzacoalcos bar during their prevalence, which is for six months in the year, from September to March. Ordinary waves are five or six feet from trough to crest, and with a moderate wind on shore, in conflict with the current of the river, the sea would break on the bar. Deducted from the total depth, no sufficient depth of water remains to float a vessel of a size and draft proper to venture into the open sea.

In respect to the climate of Tehuantepec, Sr. Moro mentions that he had frequently seen the thermometer at Tehuantepec stand at 92° Fahrenheit at 7 o'clock in the morning. The vomito, (yellow fever,) it is notorious, prevails along the whole coast of Mexico from Vera Cruz to Campeachy.

APPENDIX.

A.

REPORT OF LIEUT. JEFFERS.

IN reference to the subjoined letters from Lieut. JEFFERS, it should be observed, that they were intended to be submitted only as preliminary to a full Report, the completion of which was prevented by circumstances already explained. The first letter was written at Comayagua, and refers to that portion of the line lying between Comayagua and the Gulf of Fonseca; the second, dated at Omoa, to that portion between Comayagua and Puerto Caballos.

No. I.—MR. SQUIER TO LIEUT. JEFFERS, U. S. N.

COMAYAGUA, May 15th, 1853.

MY DEAR SIR:

We have now passed the “divide” between the Atlantic and Pacific Oceans, and the question of feasibility in the enterprise in hand, may be considered as solved with approximate accuracy. Before proceeding to negotiations, I am desirous of having from you a statement of your views upon this point, in such form that it may be transmitted, with my own letters, to my associates. The remainder of the line from here to Omoa, I propose shall constitute the subject of a second report. Of course no report can be made in a complete form, with detailed statements and estimates; nor is it expected, inasmuch as nothing more than a *reconnaissance* of the country has been contemplated, to determine the question of feasibility, and preliminary to a regular survey. The special points upon which I ask your views are:—

The feasibility of the line thus far examined, in respect, 1st. To its directness; 2d. In respect to its western terminus; 3d. The character of country through which it passes, and the facilities which it affords for such a work, as, for instance, the absence of forest, the supply of timber and stone; 4th. The temperature and salubrity of the climate; 5th. The practicability of

carrying on constructions, and obtaining supplies, on the supposition that the plain of Comayagua, and the Island of Tigre shall, respectively, constitute a base of operations.

I am, Sir,

Your ob't serv't,

E. G. SQUIER.

No. II.—LIEUT. JEFFERS TO MR. SQUIER.

COMAYAGUA, May 15th, 1853.

DEAR SIR :

In reply to your note of the 15th inst., requesting a report, based upon the *reconnaissance* which has been made of the route from Fonseca to this place, with respect to the feasibility of opening a route of communication between the Atlantic and Pacific Oceans, and particularly upon the special points therein enumerated, I give the following general summary.

1st. With respect to directness. In this respect the projected line from Tigre Island by the valley of the Goascoran, the plain of Comayagua, and the valley of the Humuya, presents extraordinary facilities. The valley, through which flows the River Goascoran, is a great transverse valley, lying in a direction due north and south between the Lepaterique range on the east, and the San Juan mountains on the west. In the lowest part of the valley, which is from one to four miles wide, sloping down from the bases of the hills, the river has gradually worn a bed, and pursues a serpentine course between banks of from ten feet in height at the mouth, to about thirty feet at San Juan, above which place, the river is divided into two principal branches, each of which has numerous tributaries.

The ranges of mountains which border the valley extend north to the plain of Comayagua, where they are abruptly terminated. At this point, the Cordilleras, or great Pacific coast range of mountains, are entirely interrupted.

Between the ranges are several parallel ridges, 1000 to 1500 feet in height, lying north and south, their steepest sides to the west, in the valleys of which rise the head waters of the Goascoran, flowing into the Pacific, and those of the Humuya flowing northward into the Atlantic. These valleys are the passes through which it is proposed to form the communication with the plain of Comayagua. The plain of Comayagua is about forty miles in a north and south direction, by fifteen to twenty miles from east to west. Many lateral valleys, through which the head waters of the Humuya flow, open into this plain. There is a gentle descent from the summit to the city of Comayagua, situated on the northern limit of the plain. This

point lies nearly in the shortest and most direct line between the two oceans; the deviation not increasing the distance more than five miles.

If the port of La Union is selected for the western terminus, the line of the road would lie upon a plain with a gradual ascent to a total elevation of 170 feet, at the town of Goascoran, distant, in a direct line, fifteen miles from the port. This line would cross the Sirima and Goascoran, requiring some four hundred feet of bridging. If Sacate Grande be selected for the terminus, the road will lie along the bases of the small hills below Goascoran, to the margin of the Bay of Fonseca, thence upon a causeway one and a quarter miles in length to the island;* for this causeway a temporary communication by ferry might be substituted, and would perhaps be preferable as a permanent arrangement.

From Goascoran the river pursues a general direction to the north, winding through the valley, until it reaches the town of Caridad, a distance of 30 miles, and at an elevation of 580 feet. The road would lie upon a table elevated fifty feet above the low water mark. The average rise of the water at Caridad is fifteen feet. To this point there would be no heavy cuttings, or curves less than a mile radius, and no bridges over thirty feet water-way. At Caridad the mountains approach the river, and some heavy cutting would be required for a couple of miles to turn their bases. From this point to San Juan, which place is at an elevation of nine hundred and fifty feet, we have a table gently sloping toward the river. Two miles above San Juan, the hills again approach the river for a short distance, and again recede, until we reach the valley of Rancho Grande, where there is a collection of four huts on the line of the road, at an elevation of 1900 feet. At this point the river divides; the eastern branch, called the Rio Rancho Grande, comes from the north-east; the western branch, the Chaguiton, from the north-west. The main road crosses the Rancho Grande branch at the summit, at the pass of Rancho Chiquito, where there is a hut and shade for travellers, situated on a slight elevation, in a small plain.

The head-waters of the Goascoran and Humuya are, at this point, distant but two hundred yards, with so slight a ridge between them as to be almost imperceptible; the elevation of the summit is 2400 feet.

From Rancho Grande to the summit no serious difficulties present themselves beyond the grade, which will not exceed eighty feet to the mile. A cutting of fifty feet at this point for eight hundred yards, will relieve the grade to the extent of one hundred feet.

By the Chaguiton branch, and the valley of the Rio Carisal, the country is of a very favorable character, to the summit at the Hacienda of Guajoca.

* Subsequent examinations showed that the island can be reached by the construction of a pile bridge, one hundred and fifty yards in length.—E. G. S.

This pass is one hundred feet lower than that of Rancho Chiquito, the summit upon a plain half a mile in extent. From this pass we descend to the plain of Comayagua, by the valley of the Cururu, and past the villages of Tambla and Yarumela, to the city of Comayagua. The first six miles of this division would be over broken ground, requiring some heavy cutting and filling; the remainder of the distance would be over an almost unbroken plain.

From Rancho Chiquito the road would pass near Yarumela, in a direct line to Comayagua, offering in no part special difficulties of construction. The relative advantages of these two passes can only be established by a detailed survey. The pass of Rancho Chiquito presents more favorable ground for the descent to the plain; that of Guajoca a better route from the valley of the Rancho Grande, with a less elevation at the summit by one hundred feet. The distance by the pass of Guajoca is somewhat greatest.

2d. With respect to the point to be selected as the terminus. The Island of Sacate Grande, opposite Tigre Island, presents the greatest advantages. First, the road lying entirely within the limits of one State, its business will be less trammelled by police and customs regulations. Secondly, the harbor is somewhat easier of entrance and exit than that of La Union, though, in this respect, both are excellent. Thirdly, there is sufficient depth of water and room for any probable number of the largest ships. The port has already been constituted a Free Port, and the situation is remarkably salubrious.

Port La Union, although from two to three miles nearer, is in another State; therefore, the possibility of collisions between the States, and differences in respect to duties, might injure the business of the road. The water is moreover shallow, directly in front of the town, for a distance of half a mile; nearer Chiquirin Point, where the channel is near shore, the tides run with great force, a serious objection in a crowded harbor. It would also be necessary to bridge the Goascoran and Sirima.

3d. The character of the country through which the road would pass and the facilities it would afford.

The country is in general of the most favorable character. The line of the road being traced upon a table on the banks of the river, and beyond the reach of freshets, presents the character of an inclined plane, from the summit to the harbor. The amount of cutting and filling will be very small, except in the division on each side of the summit; the curves will be good, and the grades not greater than are to be found upon successful roads. There will be no tunnels required and very little excavation in rock.

The elevation to be overcome, to pass the summit at Rancho Chiquito, is

2400 feet, but when it is considered that there are no descents, *and that it is the total of ascents, and not the elevation of the summit*, that constitutes the expense of working, it will be seen that this is by no means unfavorable.

South of Goascoran the formations are of limestone, white sandstone, disintegrated quartz, gravel and sand, mixed with lavas and volcanic stones. No cutting of any extent will be necessary in these rocks. At Goascoran there are extensive beds of blue limestone, and in all the streams an immense quantity of large boulders of granite, gneiss, conglomerate, and sandstone. From this point, the rock is a white sandstone, sufficiently soft to be quarried with the pick, but hardening and toughening by exposure. Its durability is sufficiently proved by the existence of engraved figures upon the rocks near Aramecina which are in a good state of preservation, although of a date anterior to the conquest. The aqueduct at Comayagua, for some distance on the borders of the stream, is cut in this rock, evidently with the pick, the marks of which are still visible. Excavations can, therefore, be made at an expense little or no greater than in earth, with the advantage of durability, and no liability to wash. Upon the whole line there is abundance of gravel, sand, lime, and brick-clay.

The soil of the valley, or rather plain, of Comayagua, is based upon a stratum of white clay, overlaying sandstone. The eastern side is composed of a substratum of sand and gravel of great depth, in which are imbedded large boulders of granite, gneiss and quartz conglomerate; the western side, of gravel, red clay, limestone and sandstone boulders; the whole covered with a rich soil, except a few ridges denuded by the heavy rains.

In the vicinity of La Piedras and Comayagua are inexhaustible quarries of a handsome and durable blue marble, which affords both an excellent building material and lime. This limestone is both *in situ* and in boulders, of all sizes, in the beds of the torrents, and on the sides of the mountains.

The practice of burning the dry grass before the summer rains, prevents the growth of large timber in the lower part of the valley, except on the borders of the streams, and upon the hills; this, with entire absence of jungle, affords great facilities for carrying on a survey, or the work of construction. With some care, one can ride in any direction, and there are no impediments to walking. The cost of a survey, as well as the usual expense of clearing and grubbing the line of the road, is, therefore, considerably reduced; the transport of materials is also greatly facilitated.

At Aramecina, the yellow pine appears on the hills, and at San Juan and Aguanqueterique, it is to be found of good size and in inexhaustible quantities, in the immediate vicinity of the road. The pine attains a size of 30 inches, and from fifty to seventy-five feet of altitude, differing in no

respect from the best North Carolina. The oak is also to be found in considerable quantities, as also many other useful and valuable woods in any desirable abundance.

The width of the valley is so small, compared with its length, that there are no streams to be crossed, between the terminus and the summit, having a water-way to exceed thirty feet: the expense in this important item will consequently be exceedingly small.

4th. The temperature and salubrity of the climate. At Comayagua, Lat. $14^{\circ} 28' N.$, Long. $87^{\circ} 39' W.$, 1800 feet above the sea, the average temperature, since our arrival, with the sun vertical at noon, has been 74° at 6 A. M., 84° at M., 80° at 6 P. M.; a temperature agreeable, salubrious and proper for the employment of extra-tropical labor.* This temperature is maintained to a point near the coast, and is probably due to the fact that the prevailing winds are from the north, drawing down the valley of the Goascoran between the Lepaterique and San Juan mountains, the cool air of the table land and mountainous region. Upon no part of the route is to be found the dense jungle and rank vegetation of the tropics; but, on the contrary, the soil is dry, the country open and salubrious. At La Union, the thermometer, in April, the hottest month, occasionally reached 94° at 3 P. M., but at this hour the volcano of Conchagua rising beyond it, shuts out the sea-breeze. At Amapala, (Tigre Island,) our stay was too short to determine the average temperature, but it is considerably below this figure. Even at the embouchure of the river, there are neither marshes nor swamps to taint the air with pestiferous effluvia. To the absence of these, and the influence of a tide rising ten feet, to scour the shores, must be attributed the healthfulness of the coast.

5th. The practicability of carrying on constructions and obtaining supplies, on the supposition that the plain of Comayagua and Tigre Island shall respectively constitute a base of operations. Tigre is a most excellent depot for the Pacific division, being a good harbor, easily accessible, and a Free Port. There is a camino real or good mule road from Nacaome, (a point accessible by steamers or boats,) on the east side of the river, to Comayagua, over which all the travel now passes; also a similar road from La Union on the west side, as far as San Juan. At a slight expense, these roads can be shortened, improved, and may be made passable for carts. In order to avoid the construction of bridges, these roads have been, in many cases, carried over mountains, when the only difficulty to be overcome in carrying them round their bases, has consisted in bridging a stream twen-

* This average is for the month of May, which, next to April, is the hottest of the year. June showed an average of three degrees less, and the difference from August to April is still more decided.—E. G. S.

ty-five to thirty feet in width! For the construction of bridges, there is, nevertheless, abundance of timber on the ground.

The smaller streams running into the Goascoran afford a supply of water-power, applicable to the running of saw-mills or other machinery.

The Goascoran may be made available as a means of transport in the winter, or rather rainy season; and, with some improvements, at *all* seasons. The mouth of this stream is obstructed by a sand-bar, but may be entered on the tide at a quarter flood: this bar may be removed by dredging. Above these are obstructions, caused by natural dams of large boulders: by removing these boulders from the centre of the river, we can create a series of ponds and sluices, forming a slack-water navigation as far as Caridad, probably to San Juan. For the purpose of rafting timber from above, should it be required, and transporting materials in boats, the river will be very serviceable.

Native labor can be obtained from this and the adjoining States in sufficient quantity; and, at the rate of wages, (twenty-five cents per day,) would be very useful. There can, however, be no difficulty in introducing foreign labor, and its employment will be more satisfactory.

The river Humuya, at Comayagua, is at present of an average depth of three feet, breadth one hundred and fifty feet; and, from the information we can obtain here, we have every reason to believe that it is navigable for the greater part of the distance from this point to the sea, thus giving us a most useful auxiliary in the construction of the remainder of the road.

Whatever may be the character of the remainder of the route, the principal difficulty has been overcome in passing the summit, and the feasibility of the route may be considered as practically established.

I have the honor to be,

Respectfully, your ob't serv't,

W.M. N. JEFFRRS,

No. III.—MR. SQUIER TO LIEUT. JEFFERS, U. S. N.

COMAYAGUA, June 4th, 1853.

MY DEAR SIR:

Herewith you will receive an order from the Political Chief of this department to the officers under his jurisdiction, for all such assistance as may be required in your passage to Espino, and thence down the river to the sea.

You are already apprised of the nature of the information desired respecting the river, and the valley through which it runs; these are:

1st. In respect to the facility for a road along its banks.

2d. In respect to the extent it may be used either as accessory or permanently, in opening a road between the seas.

3d. The nature of the land on its banks, and its value agriculturally, or on account of its existing natural products.

4th. The character of the rivers uniting with the principal stream, and their probable value for purposes of navigation.

5th. And most particularly, the nature of the coast near the mouth of the river Ulua; if the river may be entered by vessels, and of what size.

6th. If the places known as Puerto Sal, Puerto Caballos, Triunfo de la Cruz, or any others near the mouth of the Ulua, can be used as ports.

7th. If in ordinary weather steamers may anchor off the mouth of the Ulua and discharge or receive passengers and freight.

8th. If roads can be constructed readily from these points to a proper point of embarkation on the river.

9th. The facilities which Omoa may offer as a port, and the feasibility of reaching the Ulua from there, both at a high and at a low point on the same. In fact, next to the question of crossing the summit between the two seas, the question of the Atlantic terminus of the contemplated line is most important, and any information upon it cannot fail to be useful and interesting.

Yours respectfully,

E. G. SQUIER.

No. IV.—LIEUT. JEFFERS TO MR. SQUIER.

OMOA, June 23d, 1853.

DEAR SIR:

I arrived at this place on yesterday, from the mouth of the Ulua, having made a thorough *reconnaissance* of the valley of the Humuya, and of the Ulua, from its junction with the former to the sea; also of the harbors of Puerto Sal, Triunfo de la Cruz, Puerto Escondido, and Puerto Caballos. In accordance with your instructions of June 4th, I transmit the following brief report upon the points therein enumerated, *seriatim* :—

1st. There can be no difficulty in constructing a rail, or other road, upon either bank of the river Humuya, from Comayagua to its junction with the Ulua; the left bank, however, presents the most favorable features.

From the plain of Espino to the junction of the rivers, the Humuya pursues a nearly direct course between hills of from 50 to 500 feet of altitude; which, in general, come down to the banks of the river, but occasionally recede, and leave strips of level above the reach of inundations. The slopes of these hills are seldom abrupt, and no heavy work will be required at any point.

The Rio Blanco and Humuya unite with the Ulua at the same point, and below their junction the land is level, swampy, subject to annual inundations, covered by dense forests, and, in the rainy season, by immense lagoons; from which unfavorable features, I conceive that it will be necessary to confine the road to the left bank, following, for some distance, the line of the camino real above the limits of the floods.

Commencing at Puerto Caballos, it should take an E. S. E. direction along the base of the coast range for about three miles, to turn the flank of the hills, thence across the plain to Santiago, in nearly a direct line beyond the limits of the overflow, and cross the Ulua, which, above this point, is called the Venta, about two miles above its junction with the Humuya, thence, still upon the plain, about ten miles, to the Humuya, at a point where the mountains first approach the banks, and confine the location of the road strictly to the valley of the river, up the left bank to near Espino, where we cross to the right bank, and pursue a direct course to Comayagua. This line presents no difficulties beyond the construction of the following bridges: one of 800 feet (500?) span over the Chameleon; one over the Venta; one of 60 feet over the Rio Blanco; one of 60 feet over the Uri; one of 40 feet over the Masagua; and one of 125 feet over the Humuya. *Quite forty miles will be over a level plain*, or an ascent so gentle as hardly to be perceived, and on that portion of the line which lies on the bank of the Hn-muya, the alternation of cut and fill is highly favorable.

2d. The Ulua can be used as accessory, and in the construction of the road, may be of essential service; *it can be navigated by a light draft steamer at all seasons, as far as the junction of the rivers*; and the Humuya, for several months, as far as the mouth of the Sulaco, but beyond that point the river cannot be made of service except in rafting down timber. The numerous rapids, short bends, sudden rise, and temporary duration of the floods, and the character of the bottom, composed entirely of sharp rocks, forbid all hopes of improvement in the upper part of the river.

3d. From the plain of Espino to the mouth of the Humuya, the country is hilly, but intersected with numerous fertile valleys. This portion is more valuable for grazing than for agricultural purposes. The hills are covered with the pine and oak, and on the borders of the stream exist vast quantities of mahogany, cedar, guanacaste, india rubber, and other valuable trees. The banks of the Ulua are covered with valuable woods, and the land, when cleared, is eminently adapted to the growth of cotton, sugar-cane, rice, and, in fact, all tropical products. *The plain, extending from the coast to Yojoa, not one hundredth part of which is under cultivation, is highly valuable.*

4th. The rivers which form the Humuya and the Ulua, are generally torrents in winter, and greatly embarrassed with shoals, large boulders, and

dams or ledges of rock, in summer. They are of little value as channels of communication in their present state, and can only be improved by an enormous outlay.

5th. The coast near the mouth of the Ulua, and for some thirty miles inland, is flat, and in the rainy season, almost entirely inundated, so that the waters of the Ulua and of the Chamelicon unite; as in all similar rivers, the banks are some little higher than the back country, which is, in the rainy season, an immense lagoon.

The mouth of the river Ulua is obstructed by a bar, having at this time but nine feet of water upon it; it may be said to be impassable for sailing vessels, as the outset is so strong that a fresh breeze is required to enable them to stem the current, and with a fresh breeze the sea is very heavy. *Steamers drawing seven feet may enter at all times; and, from June to January, ascend as far as the junction of the Humuya.* The navigation is obstructed by snags, sawyers, and drift-wood, but these impediments may easily be removed.

6th. *Puerto Caballos is a good harbor, of great capacity, sufficient depth of water, and easy of entrance and exit.* Situated at the base of the hills, there are neither marshes nor swamps to affect the healthfulness of the locality, which is sufficiently extensive for the formation of a large city. The lagoon, which is of salt water, and open to the sea, abounds in fish.

Neither Puerto Sal, nor Triunfo de la Cruz, possess the requisites for a good port; both are very small, not capable of affording shelter to a dozen vessels, and not well protected from the northers which frequently blow with great severity. It would be difficult, if not impracticable, to carry the road to either of the last mentioned ports, on account of the extensive swamps to be traversed.

7th. At any time between March and December, ships may, and do, anchor off the mouth of the river Ulua, loading mahogany. There is, however, a cove about one mile to the westward, where a landing may be better effected, and at all times, excepting during the continuance of the northers.

From this landing to the river, the distance is but about two hundred and fifty yards, and a light draft steamer can, from this point, always ascend to the mouth of the Humuya, or, by the Rio Blanco, to a point near Yojoa.

8th. Puerto Caballos was, for two centuries, the principal port on this coast, and the road from that point to Santiago may still be travelled, although neglected and somewhat grown up. Roads may also be constructed, on or near the line of the contemplated road, at a moderate expense. The truck roads in the mahogany cutting of the Messrs. Follin are often several miles in length, thirty feet in width, carefully levelled, grubbed and bridged for the passage of loaded trucks drawn by six yoke of oxen. These roads are

constructed by *task work*, at the average rate of about fifty yards per man per day; or say, fifty dollars per mile. I am, therefore, of the opinion that for double that sum, or say, \$100 per mile, a road might be opened over the plain passable for carts. The line across the plain to Santiago can be, I think, made perfectly straight, because the streams have all sandy or gravel beds, an evidence that no bottomless marshes, such as those on the Panama road, are to be found here.

9th. The harbor of Omoa is an excellent port for small vessels, but does not offer the requisite security to vessels of large size, nor has it sufficient capacity. Puerto Caballos alone appears to unite the necessary qualities for the terminus, and is, in fact, all that is requisite in this respect.

The above report includes all the points enumerated in your letter of June 4th. The maps of the route I am now engaged in bringing up.

Respectfully, your ob't serv't,

W. N. JEFFERS.

B.

LETTER FROM MR. EDWARDS.

COMAYAGUA, HONDURAS,

April 26, 1854.

E. G. SQUIER, Sect. H. I. R. R. Co.

DEAR SIR:—I propose to leave this city for Omoa and New-York, at the earliest possible moment; meantime I avail myself of an opportunity of sending a letter *via* Nicaragua, to inform you that the contract signed by you, in conjunction with the Commissioners of Honduras, has been ratified by both branches of the Legislative Assembly; that the ratifications have been exchanged between myself and Don Joaquin Mesa, appointed Commissioner for the purpose; and that it has received the signatures of the Executive authorities of the State, and been proclaimed by the President as a law of the land. The terms of the Charter were slightly altered by the House of Delegates, but the alterations are not material. The principal change is made in the terms of the tenure by which we hold the lands conceded to us. The original charter provided that they should be held by the "same tenure with lands purchased from the United States." It is now stipulated that "they shall be held by the same tenure with lands purchased from Honduras." The object of the original provision was to give us perpetual control of the minerals, or rather, an exemption of the lands from

the Spanish law respecting minerals. This object, however, will be equally gained by the passage of a law now before the House providing that all minerals and mines hereafter discovered shall belong to the owners of the lands on which they may be found.

I have availed myself of the opportunity afforded by my visit, to go over the proposed line of our road, between here and the Pacific. I am most favorably impressed with the facilities for construction, and the easy grades which it affords. The only heavy work will be for about two miles, near the summit, where the side cuttings will be through chalk hills, yielding readily to the pick. I am satisfied that for two-thirds of the entire line, the road will only require to be levelled to prepare it for the superstructure.

Starting from Puerto Caballos on the north, the line of the road lies through a level country for fifty miles. It then enters the valley of the Ulua river, skirting the bases of the mountains which border it, and which enable the engineer to select any desired elevation, to Lamani, a distance of about 100 miles from the Atlantic. From thence to the summit, a distance of six miles, the rise is about 300 feet, which can be reduced by cuttings to not over 60 feet grade to the mile. I did not visit the Pass of Guajoca, which is 125 feet lower than that of Rancho Chiquito. At the summit, as I have said, is the only heavy work on the line; but as the cuttings will be in chalk, they will be easily made, without danger from slides, and at much less cubic excavation than if in earth.

From the summit to the Pacific the grade will be gentle and uniform, nowhere exceeding 55 feet to the mile. The timber on the line is abundant and convenient. The long-leaved pine, identical with that of Florida, is found profusely on two-thirds of the route, and for the remaining third of the way, covers the hills and mountains. For forty miles from the north coast, mahogany and cedar are abundant and cheap.

A company of Americans have established a fine steam saw, planing, and shingle mill, on Tigre Island, in the Bay of Fonseca, and offer to supply cross-ties for the whole road, to be of pitch pine, cedar, mahogany, and lignum-vitæ, at *seventy-five cents* each. The wood last mentioned is common on the central part of the line, as is also the live oak of Florida.

The harbor of Puerto Caballos is unequalled. From the ocean, by turning a point of land, a vessel is immediately in a protected harbor, having not less than ten fathoms of water in the middle of the bay, and five fathoms within 20 yards of the northern shore. At an expense of \$30,000 a channel 20 feet deep can be cut through a strip of land, about 150 yards wide, which separates the harbor from an inner lagoon, which has from five to ten fathoms of water. It is surrounded by good land, and the road might be terminated on the shore of the lagoon, at a saving of about three miles of

railway. Should a town be built here, it can be supplied with pure water from the hills to the S. W., at very little expense. These hills, at the distance of a mile from the port, reach the height of 400 feet; and still further, in the same direction, rise to be majestic mountains from 6000 to 9000 feet high. This range terminates abruptly near the port. For additional information respecting Puerto Caballos, I refer you to the enclosed extract from the Log-Book of the "Geo. Steers,"—Capt. Theo. Lewis, an old and experienced captain, master.

The Gulf of Fonseca, our southern terminus, requires no detailed account from me. I will only remark the extraordinary circumstance that our northern and southern termini will be in harbors without bars at their entrance, and where the water gradually shoals from deep soundings to ten, nine, eight, seven and six fathoms—this last depth, close to the land, at the most secure possible point for wharves or for anchorage.

The late superintending contractor of the Panama Railroad went over this route, and observed to me, "that one hundred miles of it required little more than levelling, to lay the cross-ties, and that the most difficult part was an easy side-cutting through a chalk hill." We have no tunnels, not a single deep cut, nor one high embankment on the whole route.

I visited the mahogany cuttings on the Ulua to observe the Caribs at work, and was much pleased to find that they are an industrious class of laborers. They are of mixed negro and Carib blood, and work as hard on fifteen dollars a month and rations, as any men I ever saw getting out timber at the North. We can get 1500 to 2000 of these, and 2000 to 3000 natives, at ten dollars per month and rations. I am offered one thousand pair of working oxen, broken to the yoke, at twenty-five dollars the pair; and cattle to any extent can be obtained in Honduras at from seven to ten dollars each.

In haste,

Respectfully yours,

AMORY EDWARDS.

C.

FROM THE LOG-BOOK OF THE SCHOONER "GEORGE STEERS."

WEDNESDAY, APRIL 17TH, 1854.—At 10 A. M. got under way with the sea breeze, weather clear and very pleasant.

Desirous of seeing the Bay of Puerto Caballos on our passage down the coast, I directed the pilot to steer for it, and at 1 P. M. we rounded the point and entered this capacious harbor. The mouth is about two miles wide,

from north to south, and the port is about the same depth, from east to west, We rounded the point, within one hundred yards of the shore, with not less than ten fathoms water, and sailed along the northern side of the bay, for the purpose of examining minutely its capacity and depth of water.

To do full justice to this capacious anchorage, and preclude the possibility of a doubt on the subject, I went myself in the boat with lead and line, and ascertained by a regular chain of soundings the depth of water for over two-thirds of the northern portion of the bay.

In the middle of the bay, or nearly so, I had 12 fathoms at several casts, gradually shoaling as we neared the north shore to 10, 9, 8, 7, 6 fathoms, and when within about 20 yards of the beach, 5 fathoms, mud bottom, clear ground. At this time we had entered the bay for about two-thirds of the distance from the point, which forms its entrance, to its head.

From the most diligent inquiry of many of those who follow the coasting trade, I am informed that westerly gales on this coast at no season amount to any thing.

Westerly winds on this coast, I am able to say from my own experience, and that of others, begin rainy, with an easy breeze gradually veering to the northwest, increasing in strength, and by the time they arrive at N. N. W. blow with great force, at times for forty-eight hours, with but little intermission, and raise a considerable swell. But they quickly subside on the clearing up of the weather, and with the least easting—say one quarter of a point.

By a reference to the chart it will be seen that a vessel is completely sheltered, when in 5 fathoms water, from any sea which may roll into the bay from the eastward, and the sea from this quarter never amounts to any thing of consequence. As an instance; the "George Steers" was anchored south about 300 yards from the south-east point of the harbor of Omoa, in 3 fathoms water, during several of the hardest westerly gales, and in no case did the water come over the bow or wet the deck of this sharp vessel, or prevent boats from landing on the beach, due east from the place where she was anchored.

With the wind from the N. W. to N., the points from which the hardest gales blow, there is room for 300 sail of vessels of all classes, from a ship of 140 guns down to a sloop or *dory*, to ride in perfect security.

A gentleman resident on this coast, and of great experience in the winds and weather hereabouts, informed me that some time back he was voyaging in a *dory*, when the sky, swell, etc., gave unmistakable evidence of a norther, and compelled him to make Puerto Caballos for security. Here he rode out in perfect safety one of the most furious northers he had ever witnessed.

THEODORE LEWIS.

D.**THE GULF OF FONSECA :****A NAVAL STATION ON THE PACIFIC.**

Extract from a despatch to the Government of the United States, on the subject of a Naval Station on the Pacific.

LEGATION OF THE UNITED STATES,
Leon de Nicaragua, June, 1850.

* * * * *

Our present and prospective interests in the Pacific, and on the Pacific Coast of the Continent, demand that all proper measures shall be taken by the Government to promote the Commerce of our country and secure the rights of our citizens in that quarter. The rise of an active commercial State in California, and the settlement of Oregon, will open new channels of trade on this hitherto essentially non-commercial coast. With their growth will spring up a traffic with the tropical republics, in Sugar, Rice, Coffee, Cacao, Indigo, Tobacco, Cochineal, Hides, Dyewoods, India-rubber, Mahogany, etc., etc., proportionate to that which exists with the West Indies upon the Atlantic coast. This commerce, it is easy to see, will be carried on in American vessels. But this is not all; the establishment of new routes of communication between the two oceans, across the Central Isthmus, by railroad or canal, or both, will open a new, but a large and profitable trade between the eastern United States and the States of Central America, New Grenada, Peru and Chili, as also with the rich Pacific slope of Mexico. The trade too, if proper precautions are taken, will fall into American hands. And with these facilities, the creation of which is no longer a speculative, dreamy thing, but practical and immediate, who cannot foresee the revolution which must take place in all existing commercial relations with the great centres of Asiatic trade, and comprehend the new and improved position which the United States will assume in respect to them?

These are matters, the importance of which is obvious to every reflecting mind. What, then, with this new field of enterprise opening before us, is the immediate duty of the Government? Unquestionably to establish such relations and enter into such arrangements with the Pacific Republics and States as shall place our commerce with them and the rights of our citizens on the best possible basis; adopting as far as possible the principle of reciprocity. This has been comprehended by the Administration, and made the subject of remark by Gen. Taylor, in his Message to Congress. And practically something has been done in carrying out these liberal views.

